with a leading face **46** and a trailing shoulder **48** interposed between projection **42** and shoulder **44.** A sand hook or undercut **49** is formed at the juncture of groove **44** and leading face **46** of projection **42.** Nozzle **14** is of the type disclosed and shown in application Ser. No. 266,393 filed June 26, 1972, supra, and assigned to the same assignee as the present invention, and reference may be had thereto for a more detailed description and operation of nozzle **14** and the significance of the specially configurated thread formation **40,** including projection **42,** shoulder **44,** sand hook **49,** etc. This specially configurated formation facilitates the thorough blending of the dry cementitious ingredients with the water while efficiently controlling the degree of turbulence generated in the nozzle to produce a consistent and thorough mix. It should be understood, however, that adaptor **10** of this invention is not restricted for use with the specific nozzle **14** illustrated in FIG. **3,** but can be used in conjunction with any type of nozzle, including metal nozzles.

In accordance with this invention, adaptor **10** is composed of a resiliently yieldable elastomeric material, preferably urethane, which is wear and abrasion resistant and sufficiently rigid so as not to deform under the pressure employed to convey the dry ingredients therethrough. However, any suitable resiliently yieldable material of sufficient durometer and density, can be used in lieu of urethane, if desired. Adaptor **10** is of a unitary, one-piece construction and can be of any convenient size suitable for a particular application.

Adaptor **10** comprises a hollow body **50** of a generally curved or rounded outline having an axial bore **52** and an enlarged diameter internal threaded inlet opening **54** (FIG. 3) at one end for receiving a suitable hose coupling, such as shown at **12** in FIGS. **1** and **5.** The other or outlet end of adaptor **10** is provided with a threaded opening **55** for receiving threaded portion **28** of nozzle **14.** Inlet opening **54** terminates in an annular end wall **56** which serves as a seat for coupling **12** and outlet opening **55** terminates in an end wall **57** serving as a seat for the threaded end portion of nozzle **14.**

An annular recess or groove **58** extends axially inwardly of end wall **56,** providing a liquid manifold and defining an inner, collar-like wall portion **60** having an end face **62** lying in a generally common transaxial plane with end wall **56.** End face **62** is beveled to form an inclined wall or shoulder **64** which also serves as a seat for a portion of hose coupling **12** and is provided with a plurality of generally radially extending teeth or ribs **65** thereon for a reason that will hereinafter become apparent. An annular recess **65** extends axially inwardly of end wall **56** in substantial parallelism with manifold groove **58** and provides a relief for accommodating radial expansion of the resiliently yieldable material in the area of end wall **56** upon compression of the same by hose coupling **12** threaded into opening **54.** An annular bead **68** is formed on end wall **56** between annular recesses **58** and **66** to engage and provide a fluid tight seal against the abutting end of hose coupling **12,** as shown in FIG. **5.**

An annular metal reinforcing ring **72** is embedded in body **50** between threaded opening **54** and the outer surface of body **50** and serves to reinforce and rigidify the inlet end of adaptor **10.** Reinforcing ring **72** is provided with an open mesh for receiving the plastic material therethrough to form a mechanical interlock therewith and has a plurality of circumferentially spaced lugs **74** struck out from the inner end of ring **72** and extending radially inwardly therefrom to properly position ring **72** within body **50** during the formation thereof by a suitable molding process.

A boss or projection **76** extends radially outwardly from body **50** and is provided with a tapped opening **78** for receiving pipe **18** (FIGS. **1** and **2**) connected to a suitable source of liquid (not shown). Opening **78** communicates with a radially extending passage **82** leading to manifold groove **58.**

In use, adaptor **10** is threaded on nozzle **14** until end wall seat **57** of adaptor **10** firmly engages the nozzle inlet end face. Hose coupling **12** is then connected into threaded opening **54** until the coupling end face **90** (FIG. **5**) is seated against sealing bead **68** of adaptor **10** as shown in FIG. **5.** An internal flange or boss **92** projects axially from end face **90** of coupling **12** and has an outer wall surface **94** overlying shoulder **64** and inclined inwardly at an angle corresponding to the angle of inclined shoulder **64.** With end face **90** in initial abutting engagement with sealing bead **68,** surface **94** rests against the outer surfaces or ribs **65** and is slightly spaced from shoulder **64** to form a series of annular passages **96** defined between ribs **65** and leading into bore **52.** Also, the spacing between coupling end face **90** and the adaptor end face **62** forms an annular communicating passage **98** between manifold groove **58** and passages **96.** Thus, water or other liquids can be directed radially inwardly into bore **52** via tapped opening **78,** manifold groove **58,** and passages **98** and **96.**

During the blasting operation, a cement mixture in dry powder form is forced under pneumatic pressure through conduit **16,** hose coupling **12,** bore **52** of adaptor **10** and through the bore of nozzle **14.** Simultaneously, a liquid, such as water, under pressure is introduced into bore **52** through pipe **80,** opening **78,** manifold **58** and passages **98** and **96.** The water is mixed with the cement particles passing through bore **52** in adaptor **10** to form a wet cementitious admixture. Thread formation **40** of nozzle **14** imparts a spiral twisting or rifling motion to the admixture to thoroughly intermix the ingredients and obtain the proper consistency and density. The rifling motion becomes progressively shallower toward the outlet end **26** of nozzle **14** and provides a choking action, the result of which is an efficiently controlled stream of cement emulsion directed at a high velocity against a background surface with relatively little rebound and relatively no dust contamination of the ambient atmosphere.

A significant feature of the liquid injection adaptor of this invention is the liquid flow control means located at the inlet end thereof which is effective to vary the rate of liquid flow therethrough and also to insure flow under a uniform pressure at the selected rate to uniformly wet the dry ingredients passing through adaptor **10.** To this end, manifold groove **58** varies in depth progressively from a maximum at liquid inlet passage **82** to a minimum at a point diametrically opposite inlet passage **82,** as best seen in FIG. **3.** Groove **58** is provided with an inclined bottom wall **100** which tapers progressively inwardly toward the inlet end of adaptor **10** from a maximum depth at inlet passage **82** to a minimum depth at a point 180° from passage inlet **82.** It has been found that in adaptors having annular manifold grooves of constant depth, the portion of liquid flowing therefrom at a point remote from the region of liquid ingress